Purpose and Need
Flying V&H Prescribed Fire
Pleasant Valley RD

Date: 11/06/2017

ID Team Leader: Jeremy Plain

Project Name: Flying V&H Rx Burn

Ranger District: Pleasant Valley

Project type: Prescribed Fire

Target start date:06 /2021

Target finish date: 2030

Expected NEPA Documentation Type: Categorical Exclusion (Use checklist, DM not required)
If Categorical Exclusion, select Category: 32.2 (6) Timber stand or wildlife habitat improvement

Project location: The Flying V&H Prescribed Fire project is on the Pleasant Valley Ranger District, Tonto National Forest. The project is located approximately 10-15 air southeast of Young, Arizona. The western boundary of the project area is Cherry Creek, and the eastern boundary of the project area is the Fort Apache Reservation. The Flying V&H project area is 59,124 acres.

NEPA Documentation Detail: Categorical Exclusion 32.2 (6) states "Timber stand and/or wildlife habitat improvement activities that do not include the use of herbicides or do not require more than 1 mile of low standard road construction. Examples include but are not limited to: Girdling trees to create snags; ii. Thinning or brush control to improve growth or to reduce fire hazard including the opening of an existing road to a dense timber stand; iii. Prescribed burning to control understory hardwoods in stands of southern pine; and iv. Prescribed burning to reduce natural fuel build-up and improve plant vigor.

Vegetation type:

Vegetation is predominantly pinyon/juniper and juniper woodland/grassland associations, with pockets of ponderosa pine on north-facing slopes at higher elevations and in canyons. Interior chaparral and semi-desert grasslands dominate the lower elevations.

Existing Condition

Table 1 displays the Ecological Response Units (ERUs) located within the project area. The majority of the project area is Pinyon-Juniper Evergreen Scrub. The PJ Evergreen

Shrub ERU is typically found on lower slopes in transition zones, often between Interior Chaparral and montane forests, and is most extensive in geographic areas dominated by mild climate gradients and bi-modal precipitation regimes. The PJ Evergreen Shrub ERU is a broad grouping of different plant associations for descriptive purposes, with tree and shrub species composition varying throughout the Region. Historically this ERU had greater than 10% tree canopy cover in later successional stages, expressed by twoneedle pinyon (*Pinus edulis*), single leaf pinyon (*Pinus monophylla* var. *fallax*), Utah juniper (*Juniperus osteosperma*), oneseed juniper (*J.* monosperma), or alligator juniper (*J. deppeana*). Pinyon is occasionally absent, but one or more juniper species are always present. Oak trees (i.e., Arizona white oak, gray oak, Emory oak) are subordinate, but have high constancy in mild climate zones between central Arizona and southwestern New Mexico. Trees occur as individuals or in smaller groups and range from young to old, but typically small stands or clumps are even-aged in structure as a consequence of mixed severity fire (at least historically). The understory is dominated by low to moderate density shrubs, with herbaceous plants in the interspaces. Shrub species include Manzanita spp. (*Arctostaphylos spp.*), mountain mahogany (*Cercocarpus montanus*), Antelope bushes (*Purshia spp.*), silktassles *(Garrya spp*.), Stansbury cliffrose (*Purshia stansburiana*), turbinella oak (*Quercus turbinella*), and sumacs (*Rhus spp*.). Typical disturbances (fire, insects, disease) are mixed severity and moderate, although some evergreen shrub woodland types exhibit infrequent fire/high severity effects (FR IV, 35-200 years, replacement severity; e.g., PJ manzanita). These disturbance patterns create and maintain tree-age diversity and low to moderately-closed canopy typical of this type. Understory plants consisting of perennial native grasses and both annuals and perennial forbs comprise the remainder of the inter-canopy interspaces. This ERU is found on well-drained soils, frequently with coarse-textured or gravelly (stony) soil characteristics. Aside from disparities in structure and composition, PJ Evergreen Shrub can also be differentiated from Interior Chaparral by longer fire intervals and less severe fire events. Due to the effects of long-term fire suppression,the current condition is severely departed from historic conditions. Typically these changes include in-filling of the canopy gaps, increased density of tree groups, and reduced composition, density and vigor of the herbaceous understory plants. Many of these sites currently are closed-canopy woodlands, with insufficient understory vegetation to support surface fires.

Table 1. Ecological Response Units (ERUs) located within the Flying V&H project area, Tonto National Forest, Airzona.

ERU	Acres	Percent of Project Area
Fremont Cottonwood - Conifer	20	<1
Fremont Cottonwood / Shrub	37	<1
Juniper Grass	1	<1
Madrean Encinal Woodland	1,853	3
PJ Evergreen Shrub	41,852	71
PJ Grass	9,832	17
PJ Woodland	21	<1
Ponderosa Pine / Evergreen Oak	1,682	3
Semi-Desert Grassland	3,207	5
Sycamore - Fremont Cottonwood	597	1

Approximately 17% of the project area is PJ Grass ERU. The PJ Grass ERU Grass occurs across the states of Arizona and New Mexico, in what were historically more open woodlands with grassy understories. Tree species include one seed juniper (*Juniperus monosperma*), Utah juniper (*Juniperus osteosperma*), Rocky Mountain juniper (*Juniperus scopulorum*), and alligator juniper *(Juniperus deppeana*). Pinyon trees include twoneedle pinyon (*Pinus edulis*). Native understories were made up of perennial grasses, with both annual and perennial forbs, and shrubs that were absent or scattered. Contemporary understories often include invasive grasses and uncharacteristically high shrub cover. The PJ Grass ERU is typically found on sites with well-developed, loamy soil characteristics (typically mollisols), within areas of warm summer seasons and a bi-modal precipitation regime. Empirical information on the historic condition of this type is lacking; however, site productivity provides inference for the development of a grass/fine fuels layer, in turn, providing inference of frequent fire and open, uneven-aged forest dynamics. At least one study, substantiating multiple tree cohorts in similar plant communities, corroborates these assumptions (Gottfried 2003). As such, trees would have occurred as individuals or in smaller clumps and range from young to old. Scattered shrubs and a dense herbaceous understory of native grasses and forbs characterize this type. Typical disturbances (fire, insects, disease, etc.) are low severity and high frequency. These disturbance patterns would have created and maintained uneven-aged and open-canopied conditions. The tree and grass species composition varies throughout the Region, consisting a mix of one species of pinyon (ranges are typically distinct) and one or more juniper species. Typically, native understory grasses are perennial species, while forbs consist of both annuals and perennials. Shrubs are characteristically absent or scattered. Due to the effects of long-term fire suppression and grazing in this type, in many locations the current condition is severely departed from historic conditions. Typically these changes include in-filling of the canopy gaps, increased density of tree groups; and reduced composition, density and vigor of the herbaceous understory plants. Many of these sites currently are closed-canopy woodlands, with insufficient understory vegetation to support surface fires. This type is similar to pinyon-juniper woodlands that occur on Region 3 National Grasslands in the subhumid and semi-arid climate gradients. Here, the ERU includes ashe juniper (*Juniperus ashei*), alligator juniper (*Juniperus deppeana*), one-seed juniper (*Juniperus monosperma*), red berry juniper (*Juniperus*

erythrocarpa), pinyon pine (*Pinus edulis*), and a few oak spp. (*Quercus* spp.). Stand dynamics are thought to be similar to the PJ Grass system (Poulos et al. 2009).

Only 3% of the project area is Ponderosa Pine – Evergreen Oak. The Ponderosa Pine—Evergreen Oak ERU occurs in the mild climate gradients of central and southern Arizona and in southern New Mexico, particularly below the Mogollon Rim, where warm summer seasons and bi-modal (winter-summer) precipitation regimes are characteristic. This type occurs at elevations ranging from 5,500-7,200 ft, on sites slightly cooler-moister than the Madrean Pinyon-Oak ERU, and with a much greater plurality of ponderosa pine. This system is dominated by ponderosa pine (*Pinus ponderosa* var. *scopulorum*), and can be distinguished from the Ponderosa Pine Forest ERU by well-represented evergreen oaks (e.g., Emory oak (*Quercus emoryi*), Arizona white oak (*Quercus arizonica*), silverleaf oak (*Quercus hypoleucoides*), grey oak (*Quercus grisea*)), alligator juniper, and pinyon pine (e.g., *Pinus edulis*). In terms of disturbance, the Ponderosa Pine – Evergreen Oak averaged greater fire severity than the ponderosa pine forests above the Mogollon Rim, and greater patchiness with less horizontal uniformity and more even-aged conditions. Site potential, fire history, and the importance of perennial grasses versus shrubs in the understory vary on a gradient between two provisional subclasses.
Understory shrubs include manzanita (*Arctostaphylos sp.*), turbinella oak (*Quercus turbinella*), skunkbush sumac (*Rhus trilobata*), and mountain mahogany (*Cercocarpus montanus*). Historically this ERU had over 10% tree canopy cover, with the exception of early, post-fire plant communities. This ERU is similar to the Madrean Pinyon-Oak ERU in terms of stand dynamics and composition but with a dominant ponderosa pine component.

Forested and woodland stands are declining in health and vigor due to drought, bark beetle infestations, high stand densities, and lack of age and size class diversity. Current vegetative conditions are not representative of those found historically. Aerial detection surveys (ADS) conducted in 2017 by the Arizona Zone Forest Health Protection Group detected only minor, individual tree mortality. However, in 2017, the severity of bark beetle-related mortality in the ponderosa pine increased. In 2017, ADS detected 1,069 acres of ponderosa pine mortality within the project area. Levels of mortality within these areas were: very light (4 acres; 1-3% affected), light (300 acres; 4-10% affected), moderate (380 acres; 11-29% affected), and severe (375 acres; 30-50% affected). In 2019, the level of bark beetle-related mortality decreased to 240 acres. In 2020, mortality within the project area was minimal due to bark beetles. Due to below average precipitation and high stand desnities, higher levels of bark beetle-related mortality are expected for 2021.

Fire has been excluded as a natural component of the ecosystem over the past few decades. Within ponderosa pine, high amounts of dead and decadent material and unnaturally dense vegetative stands of predominately smaller trees can be found. Chaparral stands are very mature, providing poor nutritional browse with an unnaturally high dead to live component. Chaparral stands are continuous with few openings, this limits plant diversity. These existing landscape features provide little to no mosaic

pattern, age class diversity, or healthy boundaries between grasslands, shrublands, and forests. As a result, the potential for large, high severity wildfire exists.

Approximately 923 acres within the fire management analysis area can be characterized as being within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.

Approximately 48,695 acres are within fire management analysis area can be characterized as having a moderate departure from natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.

Approximately 9,506 acres within the fire management analysis area can be characterized as being highly departed from the natural (historical) regime, due to decades of fire suppression and are not limited to those areas adjacent to private land.

Desired Conditions

PJ Evergreen Shrub - Seral Stage Proportions

The PJ Evergreen Shrub ERU reference condition model is adapted from the LANDFIRE National "Madrean Pinyon-Juniper Woodland" (151025) model (LANDFIRE 2010). The tree cover of the R3 model is much lower than implied by the description for LANDFIRE model 151025, and as a result the proportions reported for mid and late closed states are now assumed for open states (i.e., values reported for B and E are now used for C and D, respectively). When considering both tree and shrub cover in total, these plant communities would often have been in closed condition, though the tree component alone would typically have been low, as acknowledged by LANDFIRE developers -- "The upper vegetation canopy is composed of open to moderately dense tree layer...". Additional note: contrary to the LANDFIRE description, R3 modeling assumes that non-lethal (surface) fire would have been rare and minor in effect. The PJ Evergreen Shrub ERU is characterized by historic fire regime group III, with an average fire return interval of 35-200 years from mixed severity fire. Mean reference patch size the PJ Evergreen Shrub is 1 to 10+ acres in size, coming from tree clumps to stands.

PJ EVERGREEN SCRUB ERU REFERENCE / DESIRED CONDITION		
Ref. STATE	HISTORIC MEAN	DESCRIPTION
A	5%	Early development, post disturbance state supporting primarily herbaceous species with tree and shrub cover each below 10% canopy cover.
C	55%	Mid development state comprised of seed/sap and small trees with a predominantly open canopy.
D	40%	Late development state with open tree canopy dominated by medium to very large trees. Total cover between trees and shrubs often exceeds 30%.
B	0%	Mid development state with closed tree canopy

		from small trees.
E	0%	Late development state with a closed tree canopy consisting of medium to very large trees.

PJ Grass ERU - Seral Stage Proportions

The PJ Grass ERU reference condition model was adapted from the LANDFIRE Rapid Assessment "Juniper-Pinyon" model (RA JUPI1) (LANDFIRE 2010). Additional information is needed to supplement and refine ERU concepts for the Juniper Grass and PJ Grass ecosystems. Until then, a working assumption will be used to describe historic vegetation conditions where a plurality of tree diameter values existed to indicate one of four tree-dominated states, acknowledging that multiple tree cohorts within any one plant community were likely. Reference condition values were modified for ecological sustainability analysis work to reflect a high frequency, low severity fire regime where grass-forb-shrub (post replacement) plant communities would have been uncommon at watershed scales. The landscape proportion of 20% originally reported for state A (post replacement) was reduced to 5%, with the excess 15% distributed proportionately among the remaining open states (C and D). The PJ Grass ERU is characterized by historic fire regime group I, with an average fire return interval of 0-35 years from non-lethal surface fire. Mean reference patch size for the PJ Grass ERU is 1/10th to 1 acre from individual trees to tree groups in open stands.

PJ GRASS ERU REFERENCE / DESIRED CONDITION		
Ref. STATE	HISTORIC MEAN*	DESCRIPTION
A	5%	Early development, post disturbance state supporting primarily herbaceous species with tree and shrub cover each below 10% canopy cover.
C	25%	Mid development state comprised of seed/sap and small trees with a predominantly open canopy.
D	50%	Late development state with open tree canopy dominated by medium to very large trees.
B	10%	Mid development state with closed tree canopy from small trees.
E	10%	Late development state with a closed tree canopy consisting of medium to very large trees.

Ponderosa Pine – Evergreen Oak ERU - Seral Stage Proportions

Reference conditions for this ERU are based on The Nature Conservancy's "Madrean Pine Oak Woodland" model. The following table describes the reference condition seral

state proportions. Values are also provided for R3 Standard Desired Conditions (USDA Forest Service 2011). These are split into two categories, one for sites with Arizona white oak (*Quercus arizonica*) where the standard desired conditions reflect historic reference conditions, and one for sites without Arizona white oak with modified standard desired conditions. The Ponderosa Pine—Evergreen Oak ERU is supported a range of fire regimes. In systems supporting a predominantly grass understory, fire regime group I historically burned frequently with low intensity fire. In systems supporting a more robust shrub component, the fire regime group III historically burned with mixed severity. Historically, this ERU would have supported primarily an open canopy with patch sizes of 1/10th to 1 acre in size, though more variation in historic patch size would have occurred in this ERU than in the Ponderosa Pine Forest ERU.

PONDEROSA PINE – EVERGREEN OAK ERU REFERENCE CONDITION / DESIRED CONDITIONS					
Sites w/ Arizona white oak			w/o Arizona white oak		
TNC STATE	HISTORIC MEAN	DESCRIPTION	S STAGE %	S STAGE %	DESCRIPTION
A	4%	Grass seedling/sapling	4%	4%	Reference condition
F	5%	Resprouter dominated	5%	5%	Reference condition
B	3%	Young forest w/ grass understory, closed canopy	3%	13%	*Reference condition, and conditions indicative of even-aged stand dynamics and the development of MSO habitat.
C	24%	Young forest w/ grass understory, moderate canopy cover	24%	3%	Reference condition
D	60%	Old forest w/ grass understory, moderate canopy cover	60%	60%	Reference condition
E	4%	Old forest, lacking a grass understory, closed canopy	4%	15%	**Conditions indicative of MSO habitat and mature closed-forest conditions.

Current Management Direction

Based on 1985 Tonto National Forest Plan guidance, Best Management Practices (BMPs) and site-specific knowledge of the analysis area, the following constitute general management direction.

Forest and Woodland Vegetation

- Maintain or improve the resiliency, productivity, and vigor of forested and woodland sites. This includes creating a diversity of tree and shrub sizes which will more closely represent historic reference conditions for ERUs. Having fewer trees would decrease inter-tree competition, improve tree health, growth, and vigor, and improve overall forest health. The Forest Plan states, "Use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement". The use of prescribed fire would improve forest health by varying the age of trees and shrubs, and would reduce the amount of vegetation that could burn during a wildfire to a more manageable level. Wildfire severity and size would decrease. Wildlife habitat and overall rangeland conditions would improve by creating younger, more nutritious vegetation for browsing and grazing. Because fire is an historic component of this ecosystem, prescribed fire would be used to mimic the ecological effects of natural fire. Varying intensities of prescribed fire would be required with repeated burns over time. A prescribed fire is one that is lit by fire managers, following a plan for its size and intensity. Live and dead tree and shrub material would be reduced through repeated burning over time.
- Maintain a variety of native grasses, forbs, and shrubs throughout the area, in patterns similar to those found historically.
- Maintain stable soil conditions in treated areas for the long term. Maintain ground cover to minimize accelerated erosion. Retain large woody debris, where appropriate, to reduce erosion, and provide nutrients and sites for plant growth.
- Improve watersheds to properly functioning condition to minimize accelerated erosion and soil disturbance. Maintain or improve stream channels to a stable, functioning condition. Protect water quality to comply with regulatory standards appropriate for the uses of the affected streams.

Wildlife

- Provide for wildlife species diversity
- Maintain healthy populations of existing species.
- Improve habitat for important species.
- Manage to increase population levels of threatened and endangered species.
- Maintain forage used by grazing animals at or above a condition which ensures recovery and continued existence of threatened and endangered species.
- Ensure regeneration of vegetation in riparian areas to achieve multiple age classes and complex vegetative structure for fish and wildlife habitats.
- Maintain, enhance, and restore populations of game wildlife to provide for recreational opportunities, including wildlife viewing.
- Minimize adverse impacts to wildlife and wildlife resources.
- Maintain or improve occupied habitats for threatened, endangered, sensitive, and management indicator species, and ensuring recovery objectives are being met.
- Maintain a diversity of vegetative structural stages and species composition mixtures to provide an abundance and wide variety of wildlife species habitat

across the landscape. This includes water sources, snags, hiding and thermal cover, roosting and nesting habitat, foraging areas, loafing areas, and movement corridors.
- Maintain abundant and robust shrub (browse) species.

The Flying V&H project area falls within one Management Area as identified in the Forest Plan. Management area 5G. For management area 5G, the Forest Plan states, "Use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement".

Management Area 5G – All other lands on the Pleasant Valley RD -

- *Emphasis:* Manage for a variety of renewable resource outputs with primary emphasis on wildlife habitat improvement, livestock forage production, and dispersed recreation. Watersheds will be managed for improvement to a satisfactory or better condition, improve and manage the riparian areas to benefit riparian dependent resources.
- Watersheds will be managed to improve them to a satisfactory or better condition. Improve and manage riparian areas will benefit riparian dependent resources.
- Wildfires will be managed consitant with resourceobjectives and will be suppressed in accordance with suppression guidelines. Improve livestock forage production and wildlife habitat diversity, as well as to restore a mosaic of successional stages. Wildfires, or portions of fires, will be suppressed when they adversely affect forest resources, endager public safety, or have a potential to damage significant capital ivestments. Suppression strategy should utilize the method that requires the least cost plus net value change. Prescribed fire will be used as a tool to meet or achieve desired resource objectives.

Purpose and Need

The purpose of this project is to use prescribed fire and limited mechanical and/or hand-thining to improve forest and woodland health and wildlife habitat by reducing fire hazard and natural fuel build-up. There is a need to improve individual tree health and vigor, reduce stand densities, improve watershed conditions, and wildlife habitat diversity, to meet the direction from the Forest Plan.

Proposed Action

The Pleasant Valley Ranger District proposes to conduct prescribed burning on 59,124 acres and create shaded fuel breaks on 1,798 acres within the 59,124 acres fuel analysis area to reduce fire hazard within both forest and woodland stands and to private property, improve forest health, and create conditions conducive to the reintroduction of low to moderate severity prescribed fire.. The proposed action would help maintain and/or improve the health and vigor of forest and woodland vegetation by reducing stand densities and inter-tree competition, reduce forest fuels, reduce potential for large stand-replacement wildfires, and improve wildlife habitat conditions. Burn blocks ranging in

size from 500 to 10,000 acres would be designated and planned ignitions would be applied over several years to mimize impacts to wildlife, airsheds, and watersheds at any given time. Varied fire intensities would be used in the prescription and development of the burn plan with a goal of imitating historic natural fires that occurred within the various vegetation types. In some cases, fire intensities and frequencies would need to be higher or lower than historic patterns to allow vegetation to reach desired conditions.

In ponderosa pine, low to moderate severity understory burns would be used to reduce competition from understory, small diameter trees and shrubs. This type of fire would reduce smaller tree density while maintaining the overstory of taller trees. Historically, ponderosa pine burned at lower severity with frequent fires. To accomplish this condition, burning would take place during strategic times of the year, as well as using higher RH values and lower tempratures. Utilization of firing techniques, such as hand ignitions coupled with ariel ignitions, and using backing fire would also be used to achieve these desired conditions. Where untreated land is adjacent to private land, shaded fuel breaks would be implemented prior to broadcast understory burns. Shaded fuel breaks would be constructed using a variety of tools, hand thinning and hand piling, mastication, and mechanical thinning. Ponderosa pine would be favored for retention. Old trees, Gambel oak, and riparian tree species would also be retained. Smaller diameter trees < 18 inches DBH/DRC, evergreen oak, juniper, and brush species associated with chapparal vegetation types would be favored for removal either by hand or mechanically. The treated areas would then be burned every one to three years after they have had time to dry out. Site-specific silvicultural prescriptions for shaded fuel breaks, including size of piles and plant species, would be designed by the forest silviculturist and a site visit would be conducted before the prescription is developed. Broadcast prescribed burning should begin within a five-year period following treatment of pile units.

In most of the ERUs that contain brush species associated with chaparral vegetation types, moderate to high intensity fires would be used to mimic natural fire and historic reference conditions. The use of fire as a treatment would be applied in a mosaic pattern and not all of the area would sustain the same fire severity. There would be areas that are left unburned and areas with low, moderate, high, and very high severity burns. When applied over the whole area of chaparral vegetation, this approach would help achieve desired conditions. Openings would be created at varying sizes with most being in the 0 to 200 acre size range, although larger openings may be created. In chaparral, natural fires were historically less common but occurred at higher severities, with fire returning every 40 to 70 years. In some types of chaparral and chaparral woodland, the community is strongly dominated by manzanita. Burning in these areas is likely to enhance manzanita production. In these areas, fire would be used sparingly unless conditions will allow fire size and intensity to produce a desired mosaic pattern..

In pinyon/juniper ERUs, varied fire severity treatments would be applied. In pinyon /juniper/oak woodlands that are more open, low to moderate severity fire would be utilized to mimick ERU reference conditions and to maintain the qualities associated with an open canopy, while protecting older pinyon/juniper trees. In juniper savannahs and juniper woodlands, moderate to high severity fire would be used to reduce the number of

trees per acre, create varied habitat, and restore or maintain grasslands so there are few trees. Forests that were more open historically had lower fire severity and fewer years between fires than more dense stands. Pinyon/juniper/oak stands that were historically more dense tended to have many years between fires and experienced high to very high severity fires under extreme conditions when they did burn. Prescribed fire would be used sparingly in these types, unless conditions will allow fire size and intensity to produce a desired mosaic pattern

The desired outcome is to create a mosaic of vegetation types and seral stages consistent with ERU reference conditions which also includes adjacent treatments, past large scale wildfires, and naturally occurring openings. For areas that do not include shaded fuel break treatments, implementation would begin within one to three years following signature of the Decision Memo. The initial entry or first entry of fire over the majority of the analysis area is likely to be completed within 15 years from the date implementation begins. A second and third entry of fire may be needed during or after the projected 15 year project implementation, to achieve desired conditions.

Prescribed fire treatments would be coordinated with any juniper thinning projects which may be proposed through grazing allotment analysis and planning. This will be done in coordination with the permittee during AOI meetings. Juniper treatment areas would be burned preferably in the fall, three to five years after thinning, to allow time for grasses and other forbes re-establish. In areas of poor soil conditions,susceptible to erosion, dead material would be left intact and treatments would not be treated with fire. Burning after mechanical juniper thinning would kill resprouting junipers and maintain grassy openings. Allowing for herbaceous growth would provide improved wildlife foraging areas.

Design Features

Monitoring and Mitigation

The objective of monitoring is to determine if management is being properly implemented and if the actions are effective at achieving or moving toward desired conditions. Monitoring of burning effects would be completed by photographing various locations within burn blocks. Photo points would be randomly placed within burn blocks, marked with a steel post and coordinates recorded. Pictures would be taken at 0, 90, 180, and 270 degrees from these points and recorded. Photos would then be used to monitor pre-burn, immediate post-burn, one-year post-burn, and five-year post-burn to determine if objectives are being met.

- **Fire - Recommended Mitigation Measures**
    - Burning piles can sterilize soil, remove organic matter, and destroy soil structure. Damage from burning can be reduced by: spreading slash so slash can be broadcast burned; chipping slash, or creating small burn piles less than 15 feet wide which do not generate as much heat and produce less soil damage than larger piles.

- Maintain an adequate amount of coarse woody material (CWM). CWM consists of downed woody material greater than three inches in diameter. Soil quality standards require five to ten tons/acre of CWM in ponderosa pine forests and 7 to 14 tons/acre in mixed conifer (FSH 2554.02). Note: shaded fuel breaks can have less than the above amounts of CWM.
- Limit prescribed burning to no more than 20 percent of any 6th code watershed in a three-year period. Fire that burns with moderate to high soil burn severity can lead to greatly increased runoff and erosion that poses a risk to downstream values (flooding, channel stability, and water quality) By limiting the amount of each watershed that is burned, the risk of damage to downstream resources is reduced. If prescribed burns stay within prescription in ponderosa pine and ecosystems there may be sufficient needle cast to protect the soil in the year following the burn. In that case, it would be possible to burn another 20 percent the following year.
- Limit prescribed burning to appropriate ecosystems and conditions. Certain ecological types may not respond well to fire or may not respond well under certain environmental conditions. Prescribed fire should be limited to appropriate ecosystems and conditions.

- **Wildlife – Recommended Mitigation Measures**

  - Vary prescribed fire ignition patterns and time of year so that burning occurs to create transition areas between vegetation types (ecotones).
  - Reduce juniper density in the juniper savanna and juniper woodland vegetation types to increase wildlife forage and improve effective ground cover. Maintain existing or newly created openings to continue vigorous forage production.
  - Survey for endangered, threatened, proposed, and candidate species (listed species) prior to implementation of planned ignitions.
  - Follow management guidelines for northern goshawk, Mexican spotted owl, and Chiricahua leopard frog that are current at the time of project implementation.
  - Identify and preserve special wildlife habitat requirements throughout the process with the assistance of the Pleasant Valley RD wildlife biologist. This includes, but is not limited to, protection and retention of snags and downed woody materials, raptor nest sites, squirrel nest trees, turkey roosts, nesting cover, and loafing areas, deer fawning and elk calving areas, and retention of unburned vegetation along drainage channels to provide for wildlife hiding cover.
  - The use of motorized vehicles during treatment activities in suitable or occupied habitat will be restricted, to the extent feasible, to existing roads,

trails, temporary fuel breaks, access routes or routes otherwise determined to be the least harmful to habitat function.

- All personnel involved with fuel treatments will be briefed and educated by the PVRD wildlife biologist or other qualified personnel about listed species in the areas, the importance of minimizing impacts to individuals and their habitats and the conservation measured designed to minimize or eliminate take of species present.
- Treatment with prescribed fire to the core area of the Gentry PAC will not occur (treating the core area of the Gentry PAC will be consulted on under the Spring Prescribed Fire Project).
- Fuels treatments will not occur within .25 mile from known nest/roost locations during the breeding season (March 1 – August 31). If the nest/roost location is unknown, fuels treatments will not occur within .25 miles from the PAC boundary.
- In PACs, snags and downed logs in the areas proposed for burning will be lined, where necessary to meet Forest Plan Standards and Guidelines and to reduce effects to owl prey habitat.
- During treatment of shaded fuel breaks, no Gambel oak will be cut.

- **Heritage Resources – Recommended Mitigation Measures**

  - All sites not currently evaluated for National Historic Register eligibility would be treated as eligible for the Register for all levels of project(s) implementation.
  - No use of mechanized equipment (e.g., trucks, skidders, chippers, crushers) would occur within established site boundaries.
  - No staging of equipment or supplies would occur within established site boundaries.
  - No piles of slash would be established within site boundaries.
  - During any subsequent burning activities, no ignition points would occur within established site boundaries.
  - Fire-sensitive sites (sites containing fire-sensitive components, including but not limited to, organic elements and rock art) would be protected during any subsequent burning activities, including maintenance burns, by the use of hand lines, wet lines, or staging of an engine adjacent to the site, as determined appropriate to the resource through consultation with fire management and heritage resource personnel.
  - Standing trees within established site boundaries would be felled using hand falling techniques only.

- Standing trees within and adjacent to established site boundaries would be directionally felled peripherally, away from site feature(s).
- Slash would be scattered to limit fuel concentration within established site boundaries and to provide erosion protection, or removed entirely from within the site boundaries, as determined in consultation with heritage resources specialists.
- Removal of standing trees below 9-inch diameter at breast height (dbh) would result in no more than 5 to 10 tons per acre of fuels within established site boundaries to limit fuel concentration and potential fire damage to site component(s). Anything above this level would be removed by hand.

- In accordance with Protocol J of the Programmatic Agreement, post-treatment monitoring of sites determined to be fire-sensitive would occur to determine the effectiveness of the protection measures in order to gather data that would be used to improve planning for protection of heritage resources in future projects. This also includes monitoring of non-fire sensitive sites in order to expand available information on the effects of prescribed fire on archaeological sites. Determinations of the number of both non- and fire-sensitive sites (e.g., a percentage), which would be monitored subsequent to an individual treatment as well as the appropriate post-project monitoring requirements to be utilized would be determined by the forest archaeologist.

- The Forest archaeologist may approve additional measures to further protect sites in accordance with *Protocol J for Large-Scale Fuels Reduction, Vegetation Treatment, and Habitat Improvement Projects* (Protocol J) of the *Region 3 First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities* (*Programmatic Agreement*); however, if a lesser level of protection is recommended, or if it is likely that adverse effects cannot be avoided, the Forest shall consult with the State Historic Preservation Officer (SHPO) on additional protection measures prior to approving Heritage Resources Clearance and prior to implementation of each phase of the project.

- **Range – Recommended Mitigation Measures**
  - Structural range improvements such as water lines, fence lines, storage tanks and troughs should be avoided or cleared of adjacent vegetation where reasonable prior to burning.
  - Coordinate with grazing permittees through yearly operating plans to coordinate prescribed burning activities and grazing pasture rotations.
  - Notify grazing permittees prior to any prescribed fire activities with adequate time given to move livestock if needed.
  - Coordinate with grazing permittees to provide sufficient rest and recovery of burned areas prior to livestock grazing, dependent on fire intensity, precipitation, range readiness and plant recovery.

- **Soil, Water, Air Quality, and Vegetation – Recommended Mitigation Measures**
    - No planned ignitions would occur in riparian areas.
    - ADEQ protocol would be followed for daily approval on smoke emissions.
    - Various emission reduction techniques would be utilized; burning under higher fuel moistures, pile burning, burning in drier conditions, burning more frequently and reducing fuel loadings prior to burning.
    - Use varying ignition pattern to conserve vegetation on steep slopes to help reduce erosion.
    - Crossings for motorized vehicles across a perennial stream would not be permitted, unless an established road already exists or where dry, intermittent sections occur.
    - Avoid use of heavy mechanical equipment in: wet riparian drainages or on wet upland soils if rutting greater than 3 inches (8 cm) is occurring.
    - Placement of prescribed fire support sites (e.g., staging areas and, refueling sites) would be outside riparian areas or river/stream corridors and will utilize spill containment systems to minimize impacts.
    - Retain ponderosa pine, especially large diameter and/or "old" trees greater than 18 inches DBH. Shaded fuel breaks will favor the removal of evergreen oak, juniper, and brush species associated with the chaparral vegetation types.
    - Protect old trees from moderate to high severity fire effects during prescribed burning activities.
    - Retain Gambel oak. Favor Gambel oak by thinning around Gambel oak > 10 inches DRC.
    - Retain riparian tree species. Favor riparian tree species by thinning around trees > 10 inches in diameter.
    - Within the ponderosa pine – evergreen oak ERU, use reference conditions to guide management of seral stages. Manage for uneven-aged stand conditions. Openings created for regeneration will generally range from ¼ to ½ acre in size, with a maximum opening size of 1 acre. Maintain 50 sq ft/ac basal area of ponderosa pine.
    - Within other ERUs, use reference conditions to guide management of seral stages.
    - Unless within 1 ½ tree heights of highly traveled roads or private property, leave an average of 2 snags per acre > 18 inches in diameter.
    - No trees would be cut within MSO PACs, except for stands within the Gentry PAC that were analyzed (and will be cut under) the Rim Country EIS.

Implementation Timeline:

Project Analysis completion June, 2021. Project implementation June, 2021.

Please send your questions, concerns, to:

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